

CLAIMS

What is claimed is:

1. A system comprising:
 - a pulley attached to a building;
 - a closed loop of cable installed around the pulley and being of sufficient length so as to reach, when deployed outside of the building, below the pulley to where emergency personnel gather in an area next to a base of the building when responding to a disaster situation in the building; and
 - a winch around which the loop is to be operatively installed, the winch being located in the area next to the base.
2. The system of claim 1 wherein the pulley is permanently attached to a structural support of the building located near an edge of a roof of the building, and the cable is made of a plurality of flexible wires.
3. The system of claim 1 further comprising:
 - a load attached to the loop, wherein the winch is designed to be moved one of horizontally and vertically relative to the pulley to move the load, suspended by the loop, towards and away from a side of the building.
4. The system of claim 2 further comprising:
 - a load attached to the loop; and
 - a moveable pulley around which the loop is installed, the moveable pulley being located in the area next to the base and designed to be moved relative to the winch and said pulley to (i) increase tension in the loop as installed so that the load, suspended by the loop, moves away from a side of the building and (ii) decrease tension in the loop as installed so that the suspended load moves towards the side of the building.
5. The system of claim 1 further comprising:
 - a load attached to the loop; and
 - a moveable pulley around which the loop is installed, the moveable pulley being located in the area next to the base and designed to be moved relative to the winch and said pulley to (i) increase tension in the loop as

installed so that the load, suspended by the loop, moves away from a side of the building and (ii) decrease tension in the loop as installed so that the suspended load moves towards the side of the building, and wherein the winch is anchored to a fire department vehicle.

6. The system of claim 2 further comprising:
a load attached to the loop, wherein the winch is anchored to a vehicle and is designed to move relative to the vehicle and relative to said pulley to change tension in the loop as installed so as to move the load, suspended by the loop, towards and away from a side of the building.
7. The system of claim 2 further comprising:
a container attached to the loop, wherein the winch is secured to a vehicle, and wherein the vehicle is to move horizontally in the area next to the base to adjust a horizontal distance between the container, while suspended by the loop, and a side of the building.
8. The system of claim 1 further comprising means for automatically deploying the loop from a resting state in the building.
9. The system of claim 1 further comprising a container attached to a near section of the loop,
wherein a far section of the loop, when the loop has been deployed and installed on the winch, is positioned farther from a side of the building than the near section.
10. The system of claim 9 wherein the winch is a breech loadable, traction hoist that uses power and braking to directly act upon the far section of the loop, wherein power is used to pull in the far section and thereby lift said container and braking is used to let out the far section to thereby lower said container.
11. The system of claim 10 further comprising:
means for changing tension in the loop as installed so as to
a) move the container away from the building so that the container can be one of raised and lowered without touching the side, and

b) allow the container to move towards the building so that the container can touch the side for easier access to the upper floor.

12. The system of claim 9 further comprising a container stabilizing mechanism that includes:

a guide cable attached to the building and running along the side of the building between the pulley and the base;

a first guide line that is under tension and connects the guide cable to the container and can slide along the guide cable as the container is one of raised and lowered; and

a second guide line that is under tension and connects the far section of the loop to the container and can slide along the far section as the container is one of raised and lowered.

13. The system of claim 9 comprising a further container attached to the far section of the loop and designed for carrying further equipment or personnel.

14. A method comprising:

providing instructions to operate a system for reaching from outside an upper floor of a multi-story building, by

a) installing a closed loop of cable into a winch located in an area next to a base of the building, the loop being further connected around a pulley that is mounted on the roof or above the upper floor of the building;

b) loading a container that is attached to the loop with one or more of emergency equipment and emergency personnel in the area next to the base of the building; and

c) activating the winch in a first direction to raise the loaded container until it has reached approximately the upper floor while the winch remains in the area next to the base.

15. The method of claim 14 further comprising:

providing instructions to, prior to activating the winch to raise the loaded container, attach the container to the loop in the area next to the base of the building.

16. The method of claim 15 wherein the instructions are provided to fire department personnel, the method further comprising providing instructions that the container be brought to the area next to the base of the building by a fire department worker responding to an emergency call regarding the building.
17. The method of claim 14 further comprising:
providing instructions to, prior to installing the loop into the winch, deploy the loop from a resting state on the roof or above the upper floor of the building down to the area next to the base.
18. The method of claim 14 further comprising:
providing instructions to, when the container has reached approximately the upper floor, accept a person from the upper floor into the container and then activate the winch in a second direction to lower the container and the person towards the base.
19. The method of claim 18 further comprising:
providing instructions to, prior to activating the winch in the second direction to lower the container, operate the system such that tension is added to the loop, between the attached container and the winch, so as to move the container further away from the building.
20. The method of claim 18 further comprising:
providing instructions to, after the container has reached approximately the upper floor and before accepting the person from the upper floor into the container, operate the system such that tension is reduced from the loop as installed, between the attached container and the winch, so as to move the container further towards the building.
21. A method comprising:
providing instructions to operate a system for reaching from outside an upper floor of a multi-story building, by
 - a) installing a closed loop of cable onto a winch, the loop being further wrapped around a pulley that is mounted to a roof of the building or somewhere on the building above the upper floor;

b) attaching equipment to the loop at an area next to a base of the building; and

c) activating the winch to raise the attached equipment until it has reached the upper floor and then deactivating the winch to leave the equipment suspended at approximately the upper floor.

22. The method of claim 21 wherein the instructions provide that the equipment be one of a water hose, air hose, electric cable, pump, and tank used by a fire department for extinguishing fires.

23. The method of claim 21 wherein the instructions provide that the equipment be an electrical cable used to conduct electrical power for operating machinery.

24. The method of claim 21 further comprising:
providing instructions to operate the system in such a way that decreases tension in the loop as installed, to move the suspended equipment closer to the upper floor of the building.

25. A method comprising:
installing a first end of a length of cable into a winch, the length of cable being further looped around a pulley that is mounted to a roof of the building or somewhere in the building above an upper floor of the building;

securing a second end of the length of cable to a load at a base of the building;

securing the first end to the load in a separate operation than securing the second end; and then

activating the winch to move the length of cable in a first direction thereby raising the secured load, wherein said length and a position of the winch are selected such that the entire length of cable is under tension when the load as suspended by the cable has reached approximately the same level as the upper floor.

26. A method for reaching from outside an upper floor of a multi-story building, comprising:

a) installing a loop of cable onto a winch located in an area next to a base of the building, the loop being further wrapped around a pulley that is mounted to a roof of the building or somewhere on the building above the upper floor;

b) attaching equipment to the loop in the area next to the base of the building; and

c) activating the winch to raise the attached equipment until it has reached and is suspended approximately at the same level as the upper floor, wherein the winch remains fixed at a single location in the area next to the base until the attached equipment has reached the upper floor; and then

d) decreasing tension in the loop as installed to position the suspended equipment closer to the building.

27. A system for reaching an upper floor of a building, comprising:

a closed loop of wire rope installed around a pulley, the pulley being located at a roof or somewhere above the upper floor of the building, the loop being at least long enough to reach an area next to a base of the building when allowed to hang outside of the building;

a winch located in the area next to the base of the building and into which the loop is to be installed; and

a moveable pulley around which the loop is to be installed, the moveable pulley being designed to be moved relative to the winch and said pulley to (i) increase tension in the loop as installed so that a load, when suspended by the loop, moves away from a side of the building and (ii) decrease tension in the loop as installed so that the suspended load moves towards the side of the building.

28. A system for raising firefighters and equipment to and evacuating people from an upper floor of a multistory building, the building having a roof, a base, and at least one upper floor, said system comprising:

a first pulley mounted on the roof or an upper level of the building;

a bi-directional winch disposed at the base of the building;

a closed loop of cable connected around said pulley and said winch; and

a first container for holding at least one person connected to said loop of cable at the base of the building,

so that (1) when said winch is activated in a first direction, said first container travels to the upper floor of the building, and (2) when said winch is activated in an opposite second direction, said first container travels to the base of the building.

29. The system of claim 28 further comprising:

a plurality of pulleys around which said loop is further connected, one or more of said plurality of pulleys being designed to be moveable under power and under control of an operator of the system, relative to the winch and the first pulley, to move the first container towards and away from a face of the building.

30. A system according to claim 28, further including:

a second container connected to said loop of cable, said second container disposed on an opposite side of said loop of cable from said first container, so that (1) when said winch is activated in said first direction, said second container travels to the base of the building, and (2) when said winch is activated in said opposite second direction, said second container travels to the upper floor of the building.

31. A system according to claim 28, further comprising:

a second pulley spaced apart from the first pulley and mounted on the roof of the building, wherein said loop of cable is connected around both said pulleys and said winch.

32. A system according to claim 28, further including:

means for moving said pulley from a retracted position on the roof to an extended position wherein said pulley hangs over an edge of the roof.

33. A system according to claim 28, wherein said loop of cable is connected exactly once around said pulley and exactly once around said winch.

34. A system according to claim 28, further including:

means for storing said loop of cable on the roof of the building prior to said loop of cable being connected around said winch.

35. A system according to claim 28, further including:
means for storing said loop of cable next to a face of the building prior to said loop of cable being connected around said winch.
36. A system according to claim 28, wherein a plurality of selected positions along said loop are defined to which said first container is connectable.
37. A method comprising:
installing a closed loop of cable into a winch located in an area next to a base of a structure, the loop being further connected around a pulley that is mounted on top or above an upper level of the structure; and
activating the winch in a first direction to lower a load suspended by the loop.
38. The method of claim 37 further comprising:
placing the entire length of the installed loop, with the suspended load, under tension, prior to activating the winch, so that the suspended load is moved away from a face of the structure.
39. The method of claim 38 further comprising activating the winch in a second direction opposite the first, to raise a load suspended by the loop.
40. A method comprising:
installing a closed loop of cable into a winch located in an area next to a base of a structure, the loop being further connected around a pulley that is mounted on top or above an upper level of the structure; and
activating the winch in a first direction to raise a load suspended by the loop.
41. The method of claim 40 further comprising placing the entire length of the installed loop, with the suspended load, under tension, prior to activating the winch.
42. The method of claim 41 further comprising activating the winch in a second direction opposite the first, to lower a load suspended by the loop.

43. A system comprising:
a pulley attached to a structure;
a closed loop of cable installed around the pulley and being of sufficient length so as to reach, when deployed outside of the structure, below the pulley to where personnel gather in an area next to a base of the structure when operating the system, wherein the loop of cable is removably secured to the area next to the base until it is to be arranged for use in one of raising and lowering a suspended load, between an upper level of the structure and the area next to the base.
44. A system comprising:
a pulley attached to a high-rise building; and
a closed loop of wire rope installed around the pulley and being of sufficient length to reach, when arranged below the pulley, an area next to a base of the building.
45. The system of claim 44 wherein the closed loop has a total length of about twice the vertical distance between the pulley and the area next to a base of the building.